Brugada Syndrome in young patients

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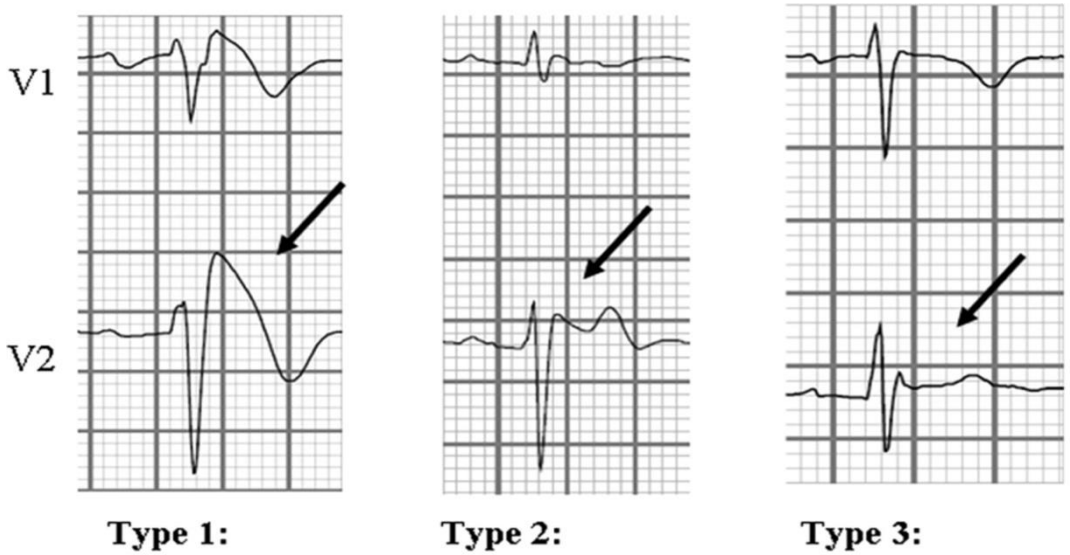
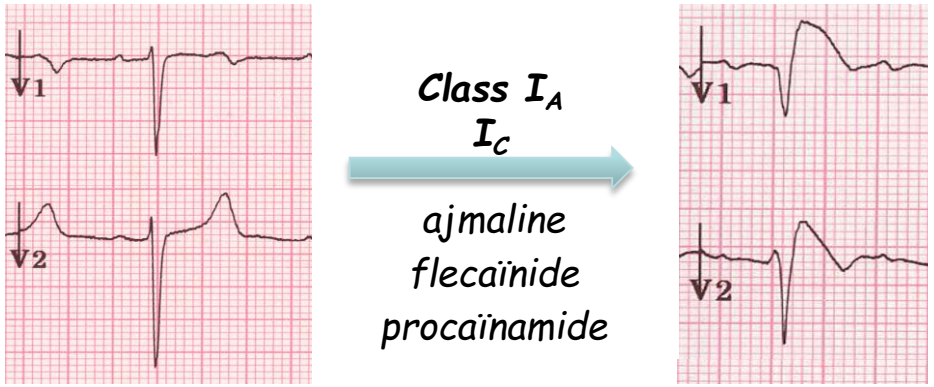
Brugada Syndrome

➢ ECG pattern of Brugada Syndrome



- **Diagnosis**
  - Type 1 ECG pattern
  - At least in one right precordial lead
  - Spontaneous or drug-induced

- **Clinical data**
  - Low prevalence : 0.02 %
  - Venticular arrhythmia and SCD
  - Lack of data



Brugada Syndrome, Mizusawa & Wilde, Circ EP, 2012
Diagnosis and Management of Patients with Inherited Primary Arrhythmia Syndromes, Priori S., HR, 2013

Population

- **106 patients from 16 tertiary european hospitals in 5 countries**

Total	106
Male, n (%)	58 (55)
Age at diagnosis, y	11.1 ± 5.7
Follow-up, mo	54 [15-99]
Spont. Type 1 ECG Pattern, n	36 (34)
SCN5A mutation, n (*n=75*)	58 (77)
Familial history of SCD, n (%)	46 (43)

Andorin, Heart rhythm, 2016

Symptoms at diagnosis

- Symptomatic : n=21
  - ✓15 syncopes
  - ✓4 aSCD and 2 VT
- Asymptomatic : n=80
  - ✓63 familial screening
  - ✓13 incidental

Andorin, Heart rhythm, 2016

Sodium blocker challenges

- **Ajmaline** : n=42 ; 14.3 ± 3.7 ans
- **Flecaïnide** : n=27 ; 13.4 ± 4.5 ans
- 33 challenges were performed below age 15
- 2 non-sustained ventricular tachycardia during challenges

Andorin, Heart rhythm, 2016

Treatment

- 11 child have been treated with hydroquinidine
- 22 were implanted with an ICD

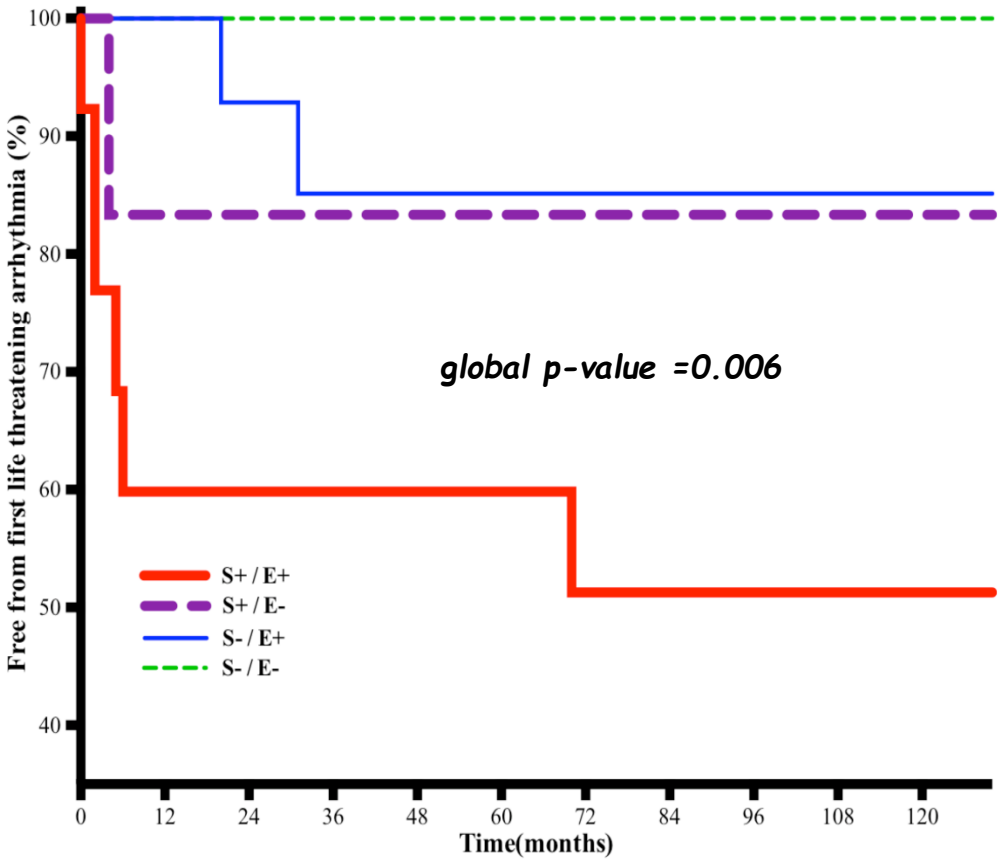
Andorin, Heart rhythm, 2016

Follow-up

- 15 life threatening events among 10 patients
  - ✓ 3 deaths
  - ✓ 2 ventricular fibrillation and tachycardia
  - ✓ 5 ventricular tachycardia only
  - ✓ ¼ triggered by fever
  - ✓ 6 syncope without documented arrhythmia
  - ✓ 4 supra ventricular tachycardia
- 8 of 11 free of events on hydroquinidine
- 9 (41%) of the 22 ICD implanted experienced serious ICD-related complications
- No event in the 17 *SCN5A* negative

Andorin, Heart rhythm, 2016

Risk stratification



n=106 months	0	12	24	60	96	120
S+/E+ = Sympto. & Spont. Type 1	14	6	6	6	3	2
S+/E- = Sympto. & Drug induced	7	5	5	4	3	2
S-/E+ = Asympto. & Spont. Type 1	22	22	13	11	6	3
S-/E- = Asympto. & Drug induced	63	63	63	63	63	63

Andorin, Heart rhythm, 2016

Asymptomatic AND drug-induced type 1 ECG pattern

➔ **LOW RISK**

Others clinical situations

➔ **Intermediate risk ?**

Symptoms AND Spontaneous type 1 ECG pattern

➔ **HIGH RISK**

Brugada group experience

Table 1
Demographic data of the young population cohort (n = 95). Patients divided into pediatric and adolescent age groups

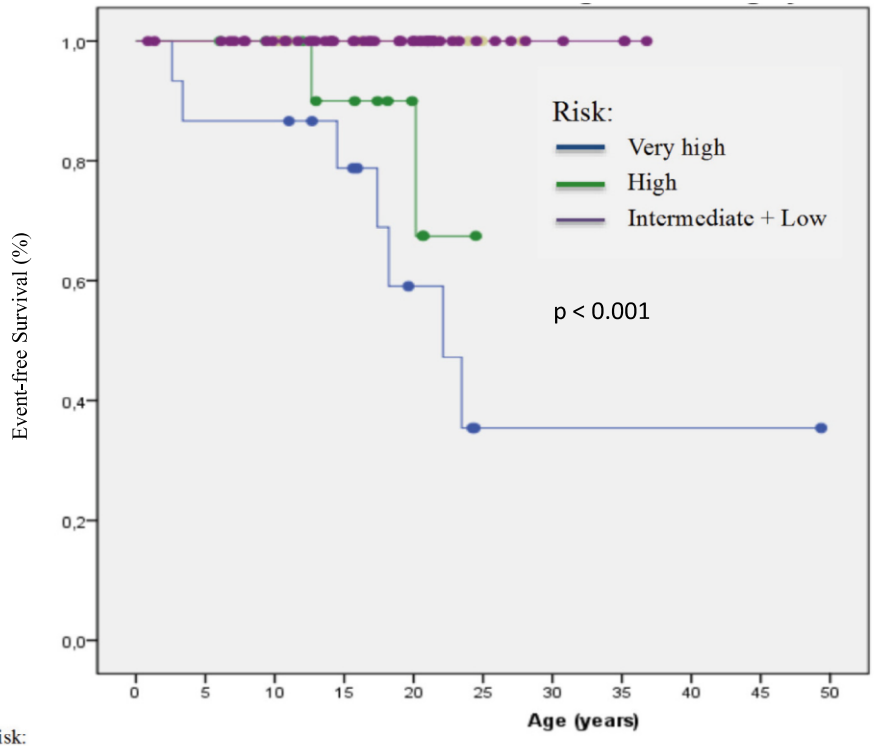
Group	Ages < 13 years	13–19 years	Entire Cohort	p value
Patients	n = 48	n = 47	n = 95	
Male	27 (56%)	26 (55%)	53 (55%)	>0.99
Age at diagnosis (years)	9.0 ± 4.7	17.3 ± 3.1	12.9 ± 8.3	
Family history SCD	24 (50%)	19 (40%)	43 (45%)	0.41
Age familiar SCD (years)	34.0 ± 26.7	22.5 ± 20.7	30.0 ± 21.0	0.47
SCD < 20 years old	6 (12%)	5 (11%)	11 (11%)	>0.99
SCD < 12 years old	2 (4%)	1 (2%)	3 (3%)	>0.99
Clinical presentation				
Asymptomatic	33 (69%)	35 (75%)	68 (72%)	0.65
Symptomatic	15 (31%)	12 (25%)	27 (28%)	0.65
SCD	4 (8%)	3 (6%)	7 (7%)	>0.99
Syncope	11 (23%)	9 (19%)	20 (21%)	0.80
Electrical Characteristics				
Spontaneous ECG type I	6 (12%)	5 (10%)	11 (12%)	>0.99
Sinus Node dysfunction	6 (12%)	3 (6%)	9 (9%)	0.48
Maximal PR (ms)	156.7 ± 38.5	169.2 ± 38.2	162.9 ± 38.6	0.13
First degree AV block	7 (15%)	9 (19%)	16 (17%)	0.59
Maximal QRS (ms)	104.6 ± 24.9	107.9 ± 24.2	106.2 ± 24.6	0.53
QRS fragmentation	5 (10%)	2 (4%)	7 (7%)	0.43
R ≥ 3 mV aVR	10 (21%)	6 (5%)	16 (17%)	0.41
QTc DII (ms)	410.1 ± 34.4	398.8 ± 33.5	402.8 ± 30.0	0.12
Atrial arrhythmias	4 (8%)	4 (8%)	8 (8%)	>0.99
Conduction abnormalities	18 (37%)	17 (36%)	35 (36%)	>0.99
EPS n	32 (67%)	40 (85%)	72 (75%)	0.05
EPS_HV	41.3 ± 9.1	44.7 ± 10.4	43.1 ± 9.8	0.20
Induction V arrhythmias	0 (0%)	3 (6%)	3 (3%)	0.11
Genetic test				
Performed	20 (42%)	16 (34%)	36 (38%)	0.52
SCN5A mutation	13 (27%)	11 (23%)	24 (25%)	0.81
ICD implantation	13 (27%)	11 (23%)	24 (25%)	0.81
Events at follow-up	4 (8%)	5 (10%)	9 (9%)	0.74

Gonzales, Am J of cardiol, 2017

Patient characteristics according to risk score

Risk Category	Score	N	Clinical presentation	ICD (%)	Eve
Low Risk	0	53	Asymptomatic with no electrical abnormality	0	0
Intermediate Risk	1–3	12	Asymptomatic with electrical abnormality	0	0
High Risk	4–5	15	Syncope with or without single electrical abnormality	11 (73%)	2 (
Very High Risk	≥6	15	aSCD or syncope with multiple electrical abnormalities	14 (93%)	7 (

aSCD = indicates aborted sudden cardiac death; ICD = implantable cardioverter defibrillator; N = number.



Patients at risk:								
Very High risk	15	13	13	10	5			
High risk	15	15	13	8	4			
Intermediate risk	12	11	11	7	6			
Low risk	53	51	44	34	23	7	4	3

Figure 2. Freedom from events according to age (in years) in each score category as per the Kaplan-Meier method.

Gonzales, Am J of cardiol, 2017

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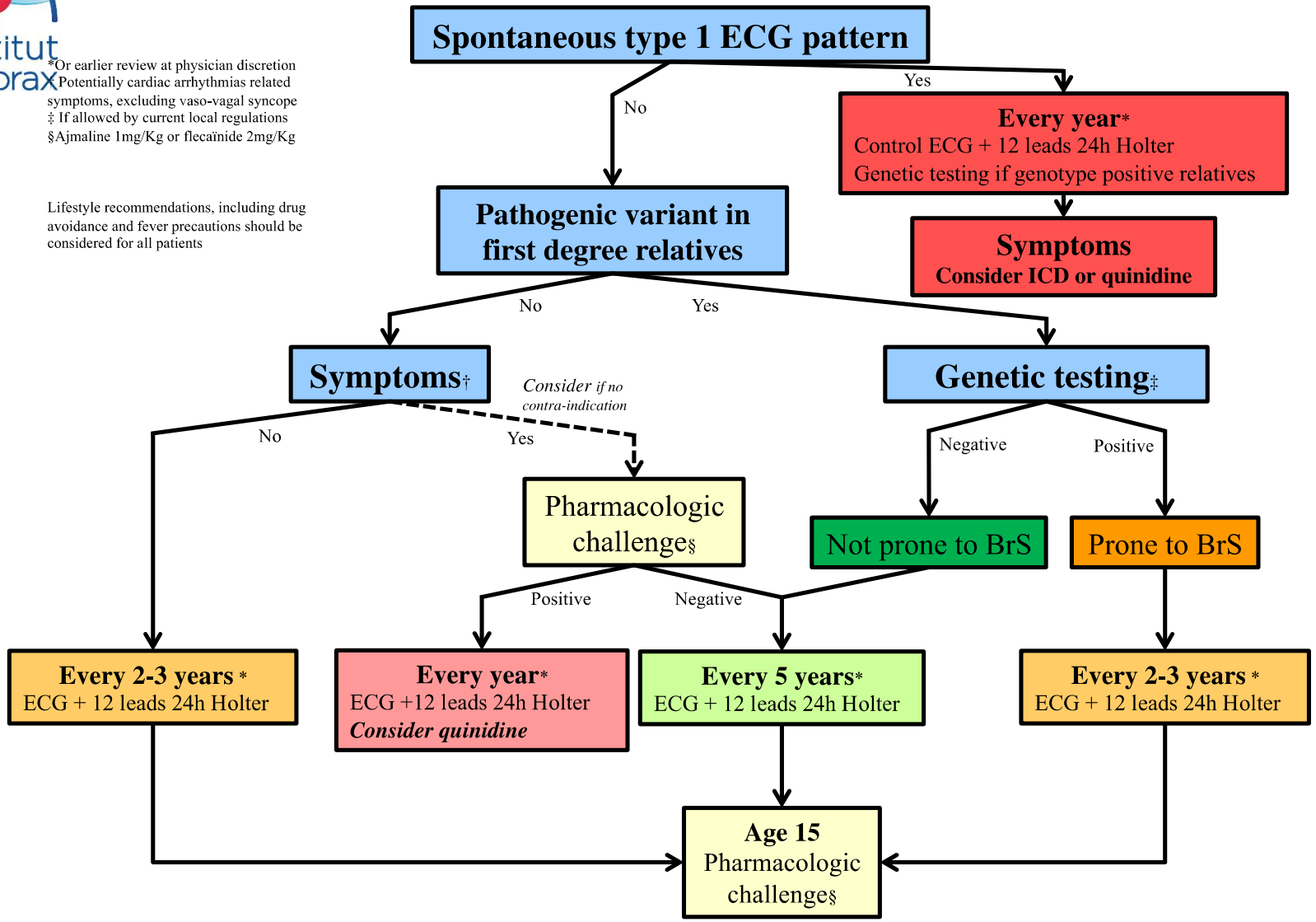
*Or earlier review at physician discretion
†Potentially cardiac arrhythmias related symptoms, excluding vaso-vagal syncope
‡ If allowed by current local regulations
§Ajmaline 1mg/Kg or flecaïnide 2mg/Kg

Lifestyle recommendations, including drug avoidance and fever precautions should be considered for all patients



Management of the Young with a known BrS in the Family

Conclusion

- **Brugada syndrome in children is unfrequent**
- **Spontaneous type 1 ECG pattern and symptoms at diagnosis are predictive of a shorter time to first arrhythmic event in the young.**
- **Arrhythmic risk is high in patients with both symptoms and spontaneous type 1 and they need to be considered for ICD or quinidine therapy.**
- **Regular clinical follow-up seems to be sufficient for patients with drug-induced type 1 without any symptom.**
- **Consider hydroquinidine in other situations ?**
- ***SCN5A* mutations**
  - High prevalence in index patients
  - No arrhythmic event in genotype negative patients + 9/10 with events were genotype positive patients
  - Could be useful for risk stratification ?
- **Fever remains the most important trigger and need to be treated.**